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ABSTRACT

As one of a series commissioned by the National Reading Center to help inform all citizens about reading issues and to promote national functional literacy, this brochure is designed to acquaint readers with different forms of visual impairment, and describes their symptoms for easy recognition. Visual difficulties are classified into two major categories: (1) refractive errors which include nearsightedness, farsightedness, astigmatism, and aniseikonia and (2) binocular errors which include the problems of adjusting the two eyes in relation to each other and color blindness. It is recommended (1) that every child's eyes be checked before he starts school to see that he will be able to read and undertake other reading-related activities without excessive strain and (2) that when a child encounters trouble with reading, visual problems should be checked out as a possible factor. (AW)

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VISUAL PROBLEMS AND READING

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VISUAL PROBLEMS AND READING ACHIEVEMENT

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Many children have some degree of trouble with their eyesight. Reading achievement may or may not be affected by visual problems, since some children with severe problems do well in reading, while others with only slight disorders seem handicapped in reading. We do know that vision deficiencies *can* be a factor in reading disability. Research shows that some types of visual problems cause more trouble than others. This brochure is designed to acquaint you with the different forms of visual impairment and describes their symptoms for easy recognition.

TYPES OF IMPAIRED VISION

Visual difficulties fall into two categories. They are called refractive errors and binocular errors. A refractive error most likely exists if a child has trouble seeing words on a blackboard or if he cannot see words in a book clearly after reading for a period of time. In such a defect, light rays from a viewed object do not fall properly on the retina (the sensitive curved wall of the eye which is the instrument of vision connected to the optic nerve). Objects become blurred. Common refractive errors are: 1) nearsightedness, in which objects at a distance are blurred; 2) farsightedness, which is difficulty in seeing close objects; and 3) astigmatism, in which case, the image is blurred.

With nearsightedness, (also called myopia) the child may squint or tend to hold his head forward while looking at a distance. He may want to sit near the front of the class in order

to see more clearly. In sports, he may be unable to play basketball or softball as well as his playmates. He may prefer activities he can do within arm's length, because he can see better up close.

If nearsightedness occurs very early in life, the child may never have known what it is to see properly. If on the other hand, a change occurs during the school years, the chances are he himself or a teacher or friend will notice it, and hence, it can be easily corrected.

Nearsightedness, for apparent reasons, is seldom associated with reading disability, but severe cases can produce fatigue in long reading sessions.

In farsightedness, (also known as hyperopia or hypermetropia) the vision may seem normal, but only because the child tends to compensate. This he does unconsciously by refocusing or flexing his eye muscles so that he can see normally. Obviously such adjusting causes strain and makes it difficult for the youngster to read for any length of time. The minute he relaxes the eye muscles, his vision becomes blurred.

This type of visual problem is more difficult to detect on school vision tests. However, if the child is very farsighted, he is apt to complain of tearing in the eyes, headaches, sensitivity to light and general fatigue, and these complaints can alert the parent or teacher to the possibility of a vision problem.

Even though the majority of farsighted children can see quite well for short periods of time, there seems to be a greater tendency for reading disabilities among the farsighted than the nearsighted.

In astigmatism, which is common in both nearsightedness and farsightedness, the vision is blurred due to an uneven curvature of the cornea—the front of the eye. If the astigmatism is severe, blurred vision will occur both at near and far distances. Again, attempts to compensate by squinting, refocusing, or tilting the head, will cause stress and

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fatigue. Printed words tend to run together, lines may be skipped and the child might find reading extremely difficult. Higher incidences of astigmatism than nearsightedness usually are found among reading disability cases, but farsightedness remains the most common of the refractive defects among disabled readers.

ANOTHER PROBLEM

All three of the refractive errors described above are checked and corrected one eye at a time and can usually be helped with properly fitted glasses. Unfortunately, even when good vision is obtained for each eye, the two eyes may still fail to work well together. If the differences in refraction between the two eyes are great enough, it may be very difficult to obtain one single clear image. Corrective lenses will increase or decrease the size and/or shape of the picture which reaches the retina and a difference in size between the two pictures (one for each eye), can cause headaches, blurred vision, light sensitivity and other discomforts. This difference in size of images is called *aniseikonia* and has been found to be a source of reading problems. Children tend to compensate for this defect by using only one eye and this can lead to total dependence on that eye. Partial or imperfect fusion may interfere more with clear vision than complete lack of fusion between the two eye images.

WORKING TOGETHER

The second main category of eye problems is binocular errors. This is the adjustments the two eyes have to make in relation to each other. The two major adjustments the eyes must make before there can be clear vision are the accommodation reflex and the convergence reflex. The accommodation reflex is the adjustment of the lens to the distance of the

object seen, and the convergence reflex is the muscular control of the degree the eyes turn 'in' so that both eyes will focus on the same spot.

To obtain clear vision, the two eyes have to work together as one—to turn in and turn out together, to readjust and refocus—as with a pair of binoculars. An extreme lack of balance may cause an eye to turn in too much, in which case we say one is crosseyed; or out too much, causing the person to be walleyed. Even a slight turning of the eye in, out or upward, can create enough strain to make a child an ineffective reader. He may read well for ten or fifteen minutes and then the one eye drifts away, print becomes blurred or runs together, or he may see two of everything. When such a child is tired, problems occur more readily.

Another problem is color blindness, which mainly affects males. About 8% of male and ½ of one percent of female children are affected. Thus nearly 5% of the students in a typical classroom are color deficient. Such problems are hereditary and cannot be corrected. If teachers and parents are aware of it, however, it lessens the confusion a child might have because colored pictures are meaningless to him.

IMPROVING CHANCES

Again, it must be stated that it is almost impossible to determine what effect a specific problem will have on reading achievement. One child can compensate for a problem while another cannot. This is the result of the human variable. But when a child has trouble with reading, it is wise to check out visual problems as a possible factor. Ideally, every child's eyes should be checked before he starts school to see that he can read and undertake other reading-related or close activities without excessive strain. When a parent has assured himself that his child can see well without stress, he knows that the child's chances to succeed in reading have been greatly improved.

BIBLIOGRAPHY

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